

PART F

CLOSURE/POST-CLOSURE MAINTENANCE COST ESTIMATE

SECTION F.1

CLOSURE/POST-CLOSURE MAINTENANCE COST ESTIMATE

F.1 CLOSURE/POST-CLOSURE MAINTENANCE COST ESTIMATE

F.1.1 INTRODUCTION

In order to establish the basis for the proper level of funding to close and provide post-closure maintenance for the GCLF in an environmentally sound manner, a cost estimate was prepared reflecting the closure design and post-closure maintenance procedures presented in Sections E.1 and E.2 of this JTD. This estimate was then combined with an estimate for construction management/quality assurance services to determine the total closure cost. This closure and post-closure cost estimate then serves as the basis to fund the closure account over the life of the landfill.

F.1.2 CLOSURE COST ESTIMATE

The Plan features are grouped into categories for convenience in presenting the cost estimate. A brief description of the components included in each category is given below. The total closure cost estimate is shown on Table 17.

F.1.2.1 FINAL COVER

Based on the proposed final grading plan, the approximate area which will require placement of final cover is 191 acres. The final cover for the GCLF will consist of a minimum two-foot thick foundation layer composed of random soil materials, a barrier layer consisting of a synthetic cover (i.e., a 60-mil LLDPE geomembrane); a drainage medium; and a two-foot vegetative layer of random soils. The cost of constructing the final cover includes site preparation, site grading, final cover placement and settlement monument installation.

F.1.2.2 FINAL COVER CONSTRUCTION QUALITY ASSURANCE MONITORING AND TESTING

Costs for construction quality assurance include the final cover placement tests, inspections and reporting.

TABLE 17
GREGORY CANYON LANDFILL
CLOSURE COST ESTIMATE SUMMARY

ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	ESTIMATED COST (\$)
1	FINAL COVER			
	Site Preparation (Survey/Exploration/Mobilization)	1 ls	\$200,000.00	\$200,000
	Slope Area (187 acres) (1)			
	Preliminary Grading (1)	8,585,588 sf	\$0.10	\$858,559
	Foundation Layer (2' thickness - 1' existing) (2)(3)	317,985 cy	\$5.00	\$1,589,925
	Barrier Layer (60-mil LLDPE Geomembrane)	8,585,588 sf	\$0.52	\$4,464,506
	Vegetative Layer (2' thickness)	635,970 cy	\$6.00	\$3,815,820
	Deck Area (4 acres)			
	Preliminary Grading	174,000 sf	\$0.05	\$8,700
	Foundation Layer (2' thickness - 1' existing) (2)(3)	6,444 cy	\$3.50	\$22,554
	Barrier Layer (60-mil LLDPE Geomembrane)	174,000 sf	\$0.50	\$87,000
	Drainage Medium - HDPE Drainage Geocomposite	174,000 sf	\$1.00	\$174,000
	Vegetative Layer (2' thickness)	12,888 cy	\$4.00	\$51,552
	Settlement/Survey Monument Installation	4 ea	\$515.00	\$2,060
Subtotal				\$11,274,676
2	FINAL COVER CONSTRUCTION QUALITY ASSURANCE			
	Field Personnel/Monitoring/Reporting	191 acres	\$2,680.00	\$511,880
Subtotal				\$511,880
3	DRAINAGE CONTROL SYSTEM (4)			
	CSP Downdrain - Slopes	7,500 lf	\$37.00	\$277,500
	Benches Inlets	47 ea	\$1,000.00	\$47,000
	Top Deck Inlets	1 ea	\$1,000.00	\$1,000
	Splash Walls	8 ea	\$1,030.00	\$8,240
Subtotal				\$333,740
4	EROSION CONTROL			
	Soil Testing	1 ls	\$5,150.00	\$5,150
	Soil Preparation	8,345,611 sf	\$0.10	\$834,561
	Seeding - Two Step	8,345,611 sf	\$0.06	\$500,737
Subtotal				\$1,340,448
5	GAS CONTROL SYSTEM (5)			
	Extend Well Heads/Replacement (if nec.)	223 ea	\$3,100.00	\$691,300
	Synthetic Boots	223 ea	\$210.00	\$46,830
	Main Collection Header	3,885 lf	\$60.00	\$233,100
	Lateral Piping	14,485 lf	\$31.00	\$449,035
	Exp. Valves, Joints, Ports, Flare Sta., Sumps Etc.	1 ls	\$484,000.00	\$484,000
Subtotal				\$1,904,265
6	SITE SECURITY			
	Signage	2 ea	\$515.00	\$1,030
Subtotal				\$1,030
7	MAIN HAUL ROAD (6)			
	3-inch AC/6-inch CMB	17,000 sf	\$1.50	\$25,500
Subtotal				\$25,500
8	DEMOLITION			
	Dismantling/Removal (Scales, Fee Booths, Admin. Building, HW Storage Area)	1 ls	\$10,300.00	\$10,300
Subtotal				\$10,300

TABLE 17
GREGORY CANYON LANDFILL
CLOSURE COST ESTIMATE SUMMARY

ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	ESTIMATED COST (\$)
9	GAS MIGRATION MONITORING SYSTEM MODIFICATION (7)			
	Replacement of Gas Migration Monitoring Probes	4 probes	\$1,030.00	\$4,120
			Subtotal	\$4,120
10	GROUNDWATER MONITORING SYSTEM MODIFICATION (5)			
			\$0.00	\$0
			Subtotal	\$0
11	ENGINEERING DESIGN (8) (2% of construction cost)	- ls	-	\$297,882
			Subtotal	\$297,882
12	CONSTRUCTION MANAGEMENT (9) (10% of construction cost)	- ls	-	\$1,489,408
			Subtotal	\$1,489,408
			Total Construction Cost	\$17,193,248
			Contingency 20%	\$3,438,650
			Final Closure Plan Prep.	\$50,000
			Total Closure Cost Estimate	\$20,681,897

Notes:

- (1) Slope area quantity estimate reflects slope factor (3:1) which increases area.
- (2) Cost assumes that only one foot of random soil would need to be placed for the foundation layer because one foot of soil would already be in-place.
- (3) Costs for preparation and compaction of the existing one foot of foundation is included in this item.
- (4) Various drainage control features (i.e., trapezoidal perimeter drainage channels, debris basins) which are shown on the Final Drainage Plan are not included in this cost estimate since they will be installed as part of active operations.
- (5) This item includes costs to modify in-place landfill gas control system at closure during placement of the final cover.
- (6) The cost for the main haul road assumes that the road will be improved with AC as the landfill is developed and that only the final 1760' from elevation 1000' upward will be constructed at closure.
- (7) Assumes a 25% replacement factor for gas migration monitoring probes at closure.
- (8) Cost is for engineering design and preparation of construction documentation (plans and specifications) for bid purposes.
- (9) Cost is for monitoring contractors work, coordinating CQA activities, meetings, liaison between design engineers and contractors, etc.

F.1.2.3 DRAINAGE CONTROL SYSTEM

Costs for the drainage control system include the construction of the splash walls, the removal and replacement of inlet structures, and downdrains.

F.1.2.4 LANDSCAPING AND EROSION CONTROL

This category covers the cost of landscaping construction which includes soil preparation and planting of vegetative materials.

F.1.2.5 GAS CONTROL SYSTEM

This category includes the cost of installation of modification of the vertical gas extraction wells and header system during placement of the final cover system.

F.1.2.6 SITE SECURITY

This category includes costs for required signage at closure.

F.1.2.7 MAIN HAUL ROAD

This category includes costs for improving the final 1,700 feet of the main haul road to access the top deck area.

F.1.2.8 DEMOLITION

This category includes costs for dismantling and removal of the fee scales and landfill scales including backfill of the pits, the household hazardous waste area, and administrative office.

F.1.2.9 GAS MIGRATION MONITORING SYSTEM

This category includes the cost to replace 25 percent of the gas migration monitoring probes at final closure.

F.1.2.10 GROUNDWATER MONITORING SYSTEM

No costs are associated with this category since no additional groundwater monitoring facilities are proposed for the site at closure. Additional costs for the GCLF will be covered under 27 CCR, Article 1 requirements for unforeseeable releases.

F.1.2.11 ENGINEERING DESIGN

This category includes costs for the preparation of construction level engineering design plans and specifications for bid purposes. This cost is assumed to be 2.0 percent of the construction cost.

F.1.2.12 CONSTRUCTION MANAGEMENT

The construction management cost for the GCLF is based on the closure construction period. This cost is assumed to be ten percent of the construction cost.

F.1.2.13 FINAL CLOSURE AND POST-CLOSURE MAINTENANCE PLAN (FCPCMP) PREPARATION

This category covers the cost to prepare the Final CPCMP.

F.1.2.14 CONTINGENCY

A 20 percent contingency factor has been added to the construction cost estimate.

F.1.3 POST-CLOSURE MAINTENANCE COST ESTIMATE

The post-closure maintenance cost estimate has been prepared utilizing information contained in Section E.2 and estimates of manpower, materials and equipment to maintain the GCLF in compliance with current applicable regulations.

The total annual maintenance and monitoring cost estimate for post-closure is shown on Table 18. These costs are projected in 2003 dollars, assuming no change in the regulatory environment with respect to the GCLF. The total 30-year post-closure cost estimate was calculated by multiplying the annual cost estimate from Table 18 by 30. The total 30-year post closure cost obligation does not factor in inflation or interest over the funding period. The actual future value of the 30-year total may be different. Annual funding will be calculated year to year in accordance with 27CCR, Section 22225.

It should be noted that the maintenance and monitoring costs presented have been projected utilizing current regulations and applicable requirements. In the event that changes occur in the regulatory conditions pertaining to the GCLF, these estimates will be adjusted accordingly, if necessary, and submitted to the CIWMB, EA and RWQCB. Groundwater monitoring costs estimated in Table 18 reflects the proposed detection monitoring program for the GCLF.

F.1.4 DEMONSTRATION OF FINANCIAL RESPONSIBILITY

Closure/Post-Closure/Corrective Action Program (CAP) Maintenance Fund

In accordance with 27 CCR, Chapter 6 and 40 CFR, Subpart G, an operator must demonstrate financial assurance for the proper closure, post-closure maintenance and corrective action for reasonably foreseeable releases at a landfill. A Trust Agreement demonstrating coverage for closure and post-closure maintenance costs has been evaluated and approved by the CIWMB (Appendix P). A financial instrument (i.e., insurance policy) to be used for corrective actions will be established and approved prior to the onset of disposal operations. In addition, the approved financial instrument will name the RWQCB as the beneficiary in accordance with 27 CCR, Section 22222.

TABLE 18
GREGORY CANYON LANDFILL
ANNUAL POST-CLOSURE MAINTENANCE AND MONITORING
COST ESTIMATE SUMMARY

ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	ESTIMATED COST (\$)
LANDFILL MAINTENANCE				
1	FINAL COVER			
	Inspection	80 hrs	\$80 hour	\$6,400
	Cover Soils Maintenance and Repair			
	Heavy Equipment	120 hrs	\$130 hour	\$15,600
	Labor	160 hrs	\$48 hour	\$7,680
	Senior Geologist	48 hrs	\$112 hour	\$5,376
Subtotal				\$35,056
2	ACCESS ROAD, BRIDGE AND INTERNAL ROADS			
	Inspection	24 hrs	\$80 hour	\$1,920
	Maintenance and Repair			
	Labor	40 hrs	\$48 hour	\$1,920
	Grader/Labor (Bench Road)	12 hrs	\$130 hour	\$1,560
	Materials	-	\$1,030 ls	\$1,030
	Bridge Maintenance and Repair			
	Labor	24 hrs	\$48 hour	\$1,152
Subtotal				\$10,157
3	DRAINAGE CONTROL SYSTEM			
	Inspection	48 hrs	\$80 hour	\$3,840
	Drainage Channels/Inlets Maintenance and Repair			
	Labor	48 hrs	\$48 hour	\$2,304
	Heavy Equipment	20 hrs	\$130 hour	\$2,600
	Materials	-	\$1,030 ls	\$1,030
	Basins/Fill Area Grading Maintenance and Repair			
	Heavy Equipment	24 hrs	\$130 hour	\$3,120
Subtotal				\$14,439
4	SITE SECURITY			
	Inspection	6 hrs	\$80 hour	\$480
	Security Fencing Maintenance Repair			
	Labor	12 hrs	\$48 hour	\$576
Subtotal				\$1,571
5	VEGETATIVE COVER MAINTENANCE			
	Inspection (1)	0 hrs	\$80 hour	\$0
	Weed Control	-	\$3,090 ls	\$3,090
	Rodent Control	-	\$1,545 ls	\$1,545
Subtotal				\$8,240
Subtotal				\$12,875

TABLE 18
GREGORY CANYON LANDFILL
ANNUAL POST-CLOSURE MAINTENANCE AND MONITORING
COST ESTIMATE SUMMARY

ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	ESTIMATED COST (\$)
6	GROUNDWATER MONITORING SYSTEM MAINTENANCE			
	Inspection	48 hrs	\$80 hour	\$3,840
	Well Repair (replace one well during the post-closure period)			
	Permit		\$300 ls	\$300
	Labor	4 days	\$1,545 day	\$6,180
	Equipment/Materials	300 ft	\$46 ft	\$13,800
	Total Repair - Replacement	-	-	\$20,280
	Total Repair - Replacement / 30 years	-	-	\$676
Subtotal				\$4,516
7	WATER TREATMENT SYSTEM OPERATION AND MAINTENANCE (3)			
	Review and Reporting	24 hrs	\$80 hour	\$1,920
	Labor	48 hrs	\$48 hour	\$2,304
	Parts, Materials and Electricity	-	\$10,300 ls	\$10,300
	Brine Removal Transport/Disposal	-	\$25,750 ls	\$25,750
Subtotal				\$40,274
8	LANDFILL GAS CONTROL SYSTEM			
	Inspection	16 hrs	\$80 hour	\$1,280
	Maintenance and Repair - Collection Facilities			
	Labor	200 hrs	\$48 hour	\$9,600
	Equipment/Materials	-	\$24,700 ls	\$24,700
	Maintenance and Repair - Flare Station			
	Labor	16 hrs	\$48 hour	\$768
	Equipment/Materials	-	\$5,150 ls	\$5,150
Subtotal				\$41,498
9	LANDFILL GAS MIGRATION MONITORING SYSTEM			
	Inspection	8 hrs	\$80 hour	\$640
	Maintenance and Repair			
	Labor	24 hrs	\$48 hour	\$1,152
	Equipment/Materials	-	\$310 ls	\$310
	Maintenance/Repair (replacement of 2 probes every 30 years)			
	Total Repair - Replacement	2 probes	\$1,545 probe	\$3,090
	Total Repair - Replacement divided by 30 years (3,000/30)	-	-	\$100
Subtotal				\$2,202
ENVIRONMENTAL MONITORING				
10	SETTLEMENT MONITORING			
	Inspection	6 hrs	\$80 hour	\$480
	Survey Monument Repair/Replacement			
	Labor	2 hrs	\$48 hour	\$96
	Materials (\$900 to replace every 3 years)	-	\$310 ls	\$310
	Aerial Survey (Once every 5 years)	-	\$2,060 ls	\$2,060
	Settlement Report			
	Engineer	2 hrs	\$112 hour	\$224
Subtotal				\$3,170

TABLE 18
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ANNUAL POST-CLOSURE MAINTENANCE AND MONITORING
COST ESTIMATE SUMMARY

ITEM	DESCRIPTION	QUANTITY	UNIT PRICE	ESTIMATED COST (\$)
11	GROUNDWATER MONITORING			
	Sampling Labor	120 hrs	\$48 hour	\$5,760
	Sample Analysis	-	\$20,600 ls	\$20,600
	Re-testing	2 ea	\$930 ea	\$1,860
	Purge Water Disposal	13 wells	\$360 ea	\$4,680
	Regulatory Interaction - Hydrogeologist	32 hrs	\$112 hour	\$3,584
	Materials/Equipment	-	\$2,060 ls	\$2,060
	Reporting (four quarterly and one annual)	-	\$30,900 ls	\$30,900
Subtotal				\$69,444
12	STORMWATER MONITORING			
	Sampling/Reporting/Inspection/Permit	-	\$3,090 ls	\$3,090
	Analysis	-	\$1,030 ls	\$1,030
				\$4,120
13	LEACHATE MONITORING			
	Monitoring/Collection/Storage/Treatment/Disposal	-	\$15,450 ls	\$15,450
				\$15,450
14	LANDFILL GAS MONITORING (Subsurface Migration and Surface Emissions)			
	Labor	120 hrs	\$48 hour	\$5,760
	Equipment/Materials	-	\$1,545 ls	\$1,545
				\$7,305
15	SITE ADMINISTRATION			
	Site Engineer	80 hrs	\$112 hour	\$8,960
	Word Processing/Assistant	80 hrs	\$37 hour	\$2,960
Subtotal				\$11,920
TOTAL ANNUAL POST-CLOSURE MAINTENANCE AND MONITORING COSTS				\$273,997
30-YEAR TOTAL COST				\$8,219,910

- (1) Vegetation cover inspection cost is included in final cover inspection line item.
- (2) Assumes replacement of 3 wells over the post-closure period.
- (3) The O&M cost for the Water Treatment System reflects a minimal inflow rate to maintain the system in good working order.